Notes

FIELD NOTE BOOK

CROCKER LAND EXPEDITION

1913 - 1915

No. 28

Koolah Trail

Drawers
Oil
cartridges
Biscuit

Powder
caps
Lead

D. B. MacMillan

Spring trip 1916

March 22 –

Cape South West

Sverdrup with three men arrived here April 10th, 1900. West of this ice being swept but very rough. Sverdrup saw Amund Ringnes Land from this western coast. Sent Isachsen and Hassel to explore it. Sverdrup and Fosheim went north.

Saw tracks of reindeer all along here. Reached farthest May 5th 1900.

Shot one hare. May 20th saw seal on ice

On Graham Island Schei found tracks of caribou, hares, ptarmigan, foxes, and bears.

Shot caribou on North Kent

Amund Ringnes Land was discovered April 16th, Easter Monday. Explored by Isachsen and Hassel. "a faint glimpse of land in the west."

3 1/2 days to cross. arrived back at Cape Levvel on the 28th. Left letter for Capt. at Cape Levvel: Musk-ox

calves on May 8th.
Storöen means "Great Island."

Isachsen and Hassel crossed from Cape South West to Amund Ringnes Land on April 14-17.
"The ice was uneven, and the sledges often ran their noses fast in the big drifts."

King Christian's Land discovered April 27th. North coast low, east coast fell away abruptly.

Plenty of reindeer on Ellef and Amund Ringnes Land. Many places of rich vegetation. On eastern side saw ptarmigan and walrus and hares.
Went around the island from April 17 to May 24 — 37 days.

Uvefjord excellent place to winter; musk-oxen, ptarmigan and hare"

30
17
13
24
37

Franklin went up Wellington Channel to 77° (1845) Assistance and Pioneer also reached 77° eight years later. (1853).

In crossing Melville Island Parry saw king eider, ptarmigan, coal, geese, musk-ox, golden plover, and a jaeger.

In one year Parry's ships obtained from Melville Island 3 musk oxen, 24 deer, 68 hares, 53 geese, 59 ducks, 144 ptarmigans — weight 3766 lbs.

Large numbers of cariboo on Melville Island. No musk-oxen seen alive on Bathurst or Cornwallis Island. Many on Melville Island + south-western part.

"Prince Patrick Island not a favorite resort for animals." Mecham

684 ptarmigan killed on Melville Island in 1853-54.

Resolute and Intrepid
got 10,000 lbs musk-ox
meat from Melville Island
Bernier saw musk-oxen
on Byam Martin Island
Earl of Bathurst – Parry

Winter Harbor
Lat. 74° 47' 10"
Long 110 48 15
Var 98° East
Provisions on Melville Island
for 66 men for 266 days
Two Ross Rifles 1000 rounds
of ammunition.
Foxes, wolves, caribou,
musk-oxen plentiful.
Up to end of Oct Bernier
killed 51 deer, 28 musk oxen,
2 seals, 17 ducks, 22 ptarmigan
2 hares, 4 birds, and 1 bear.
10 foxes
In 1853 Lieut. Mecham
of H.M.S. Resolute was travelling
across the newly-discovered
~~Land~~ island called after
H.R.H. Prince Patrick. found
petrified trees cir. 3 feet.

Sledge parties from both Investigator and Enterprise reached Melville Island in 1851-52.

Capt. McClure crossed from Bay of Mercy to Winter Harbor in 17 days. "Rough road" (April 11-28-1852)

Lieut McClintock sledged from Griffith Island to Winter Harbor in June, 1851.

Lieut Parks reached Winter Harbor from the Enterprise shortly after McClure.

The Resolute, Capt. Kellett, and the Intrepid Commander McClintock reached Melville Island on Sept. 1, 1852. Made depot of provisions at Winter Harbor. Wintered at Dealy Island. Lieut Mecham of the Resolute left the ship on Sept. 23, reached Winter Harbor, struck overland to Hidden Gulf and deposited provisions on its shores. Returned to Winter Harbor and found McClure's record on summit of famous mass of sandstone upon which Parry had engraved name of his ship.

No one has ever found Lieut Parks record at Port Hearne.

Lieut Pim of Resolute left Dealy Island on March 10, 1853. Reached Investigator April 6th

At Cornwallis Island variation 129° W

At Byam Martin Island 75° N., 104° W., Sabine found variation 166° E

On Sept. 4, 1819 Parry passed the 110 meridian west of Greenwich and thus earned the reward of £5000, authorized by act of Parliament for such success.

North Cornwall discovered by Belcher in 1850

Ellef and Amund Ringnes Land discovered in Easter

Monday. April 16.
They started across from Cape Levvel.

Graham Island is a tableland averaging centrally 1200 to 1500 feet and is surrounded by a sharply defined belt of low level country.

"In crossing over to Ellef and Amund Ringnes Land the compass alone cannot be depended upon."

Left on the night of the 16th, arrived evening of the 20th. Drove back to Cape Levvel, arriving there on the 28th.

Spring 1901

Isachsen and Hassel left Cape South West on April 14 with 550 lbs on each sledge. The ice was uneven. Reached land April 17.

Saw King Christian's Land on April 27. Caribou, wolf, and Arctic hare on Ringnes Land, also ptarmigan.

Copy

Henry Kellett, Captain

List of articles deposited upon the north side of Melville Island, on 14 July, 1853, latitude 75° 30 m. N., longitude 109° 40 m. W. :–

1 Sledge with lashings, sheers, drag rope,
4 cross bars for satellite, and a few staves
1 coverlet McIntosh cloth, lined with blanket
9 felt sleeping bags
10 pr of canvas boots
1 Ammunition bag
1 tin case bacon – 52 lbs
1 " " pemmican – 40 "
1 bag stearine – 10 lbs
2 bottles onion powder
2 bags salt
3 tins Moore's chocolate
1 – 60 lb bag biscuit
Private Clothing
Geological specimens, specimens driftwood
4 gutta percha depot cases

N.B. – The sledge is stowed with all the above mentioned articles, and the whole covered with the McIntosh cloth.

The top of the cairn upon the beach is just visible over a ridge, and bears by compass N 143 W., distant 3/4

at a distance of about
2 miles from the Cairn, and
nearly upon the same
bearing, the following articles
are left:-

1 cart, with drag ropes, lashings.
1 tin case pemmican - 20 lbs
1 bag of biscuit - 10 lbs
1 " " bacon - 8 "
1 " " wicks and torches
1 " " Stearine - 4 lbs
1 can of rum, concentrated - 1 1/4 gal
1 " " alcohol 1 1/2 gal
1 bottle curry powder
1 bottle of onion powder
Tobacco
2 sets of cooking utensils, complete
1 tent for 9 persons
1 black waterproof cloth
1 buffalo blanket
Saw, shovel, pemmican chopper and
board, knapsack, pickaxe.
1 double barrel gun and gear
1 McIntosh ammunition bag
1 sextant, Cary II 65, 3 inch
7 water bottles

The cart is stowed with the above mentioned articles, and the whole covered with the black floor cloth.

signed F. L. McClintock
Commander.

Compass Variation at
96° W — 149° 57' W

So. Western end Finlay Island
145° 58' E
Cape Bounty 107° 9' E
Dealy Island 106 28 E
Bridport Inlet 106 48 E

Kellett wintered at Dealy Island in 1852-53; also wintered in the ice pack off Byam Martin Island.

Parry and Lieut. Liddon in Hecla and Griper wintered at Winter Harbor in 1819-1820.

McClintock travelled around shores of Melville and Prince Patrick Island;

Discovery of Finlay Island

From Osborn's Journal we learn that land was seen northward of Helen Island, and later to north and north west. From Mt Richards on Cape Fleetwood at an elevation of 150 feet Finlay Land was seen at a distance of about 20 miles, covering 10° of the horizon in a north-northeast direction.

To north of Point Success 50-80 feet above the sea a portion of a tree found also fossil Bones

at Boat Beach fossils
were found in limestone.

Wednesday, March 22

In camp at Ka-mowik-z after a hard fight to get here. We came up in a regular smother, heavy drift and strong southerly wind. Leaving Littleton Island we were soon lost, making the land at head of bay. There were alternated stretches of rough ice and good going.

To my surprise we found ~~the~~ ice very thin in places under the snow. Three of my dogs dropped through in a bad place. I thought my King might drown before I could get him out as the other two were on top of him. He weighs about a hundred. Water soaked he is quite a lift.

We found open water off Cairn Point therefore were obliged to come over the hill.

The boys built two good snow houses. As Ah-we-ah-i-nah and Tau-ching-wah are with us going to Amundals we have five in one and four in other.

Should judge it to be about 20 below zero.

Thursday, March 23

For about a mile this morning the ice foot was for all the world like what we experienced along the northern shore of Greenland in 1909. At times one sledge required four men to pull and push it over the high pressure ridges.

We narrowly escaped having a bad accident. Some fifty tons of ice, I would judge, dropped into the sea almost from under Arnowding-wah's feet, clearing the whole ice foot so badly cracked that it was extremely dangerous for the next six sledges which were following. Each picked his way along rather gingerly not knowing just what moment he would drop.

Once on the sea ice, however, we found very good going & a royal road to Victoria Head leading at times between badly shattered ice and at other times along the edge of open water.

We are in camp tonight three quarters way across, I should judge.

We have seen a number of bear tracks and may see one at any hour.

Friday March 24
3rd day

Happy tonight with our bellies full of bear meat. We feasted for a time this

morning that our great
white Eagle way, which
led to the northwest had
come to an end as we
seemed to be going into
a blind alley.

We turned more to
the southward, rounded a
point, and there before us
was a beautiful high way
leading to Victoria Island,
and at the far end of
it a bear!"

Yelling "Nannook-mah!"
and snapping our whips
we bounded along rapidly
for fifteen minutes only to
see our bear disappear in
the rough ice. I thought
the chase was over, but
no! Ukeapung-wah slipped
his dogs, and with rifle
in hand plunged into the
rough ice after the bear.
E-took-ah-shoo with one
slash of a big knife cut
all his traces and followed
Ukeapung-wah as did all
the others excepting
Aumuding-wah and I.

I whipped all my dogs and away they went to the round up.

A rifle shot announced that the battle was on.

Arklio and Inuaging were soon returned telling us that E-took-ci-shoo had shot him. None of them however had a hand in it in order to claim a part of the skin.

I would not let them cut it up but told E-took-ci-shoo to take it to land at Victoria Head.

We are in camp tonight well inside Cape Sabine and should easily make well up into Buchanan Bay tomorrow. The going today much better ahead

-30

Sat. March 25 4th day

8-10 Sun 148° 30' (74° W)
long

Bear Camp

Ther -18.5 8-30 A.M.

Bar 30 " " "

Ther. -19 6-30 P.M.

Bar 29.85

Bearing of Sun 244°
Time 6-20 P.M.

Up against it today hard. For 4 hours we had the roughest kind of work ~~to~~ to reach Victoria Head. In order ~~to~~ to do so we were obliged ~~to~~ to cross an old floe of at least 20 feet above water which would make it about 160 feet thick. It must have been the projecting tongue of a glacier or a piece of the glacial fringe of Grant Land. ~~We~~ attained the summit only with a great deal of difficulty and then descended it again with nearly as much.

From this floe our progress landwards was fairly rapid.

We are in camp tonight about two miles from point in Buchanan Bay. Ice looks good.

Sunday, March 26

5th day

Buchanan Bay

Victoria Head
Sun bearing 135
Time 8.30 A.M.

Ther. -16.5 8.30 A.M.
Bar 29.75 " "
Ther. -10 8 P.M.
Bar 29.38
No wind until about 4 P.M. South.
Overcast.

A gala day! Twelve seals in about as many minutes! Our dog's are "plum" full and so are we.

At the island we found the following. 2 cases here and six tins — 132 lbs pemmican, 1 case and two tins whole wheat biscuit, 2-12½ tins white biscuit, one gal oil.

We left there all

6|112.15
18.9

whole wheat, — in 75 lbs. one gal oil, and 14 this cache, two for each team on its return.

Just inside the point, we found two large pools of water caused by the tide rushing over level ground which I could see about ten feet under water.

We stopped, thinking we might see a seal and killed twelve, the boys harpooning some at a distance of 25 and 30 feet.

Believing that a cairn of Peary's could be seen on the top of a hill at the entrance to the point I walked back and fairly wallowed in deep snow to the summit. I arrived there at length covered with sweat only to find my cabin an magnificent pile of rocks.

I am now shivering with cold and must get into my bag.

Monday, March 27, 1916

6 th day

Head Flagler Fiord.

We are more than covering our average of 17 miles a day, having covered 112.5 miles in 6 marches, an average of about 19 miles a day.

Thus far all goes well. We should get Anoatok tomorrow or next day.

Arklio's fine little pup was left behind on the trail today with piblokto. He was the finest pup I ever saw; it is a shame.

Tuesday, March 28, 1916

7th day

Ther. -24 10 A.M.
No wind

River Valley Camp.

The rise has been so gentle all day that we have hardly noticed it. We are tonight on the highest point in the pass said to be only 250 feet above sea level.

I have had good going with very little sand or rocks, much different with Sverdrup in 1899.

We noticed tracks of a musk-ox about half way up. I have not seen a living thing excepting one ptarmigan.

[illegible] is now trying for hare. It is blowing from N.E. and drifting. Ther. -17.5
Bar. 28.30.

Wednesday, March 29.

8th day

Ther. 8 A.M. -17.9

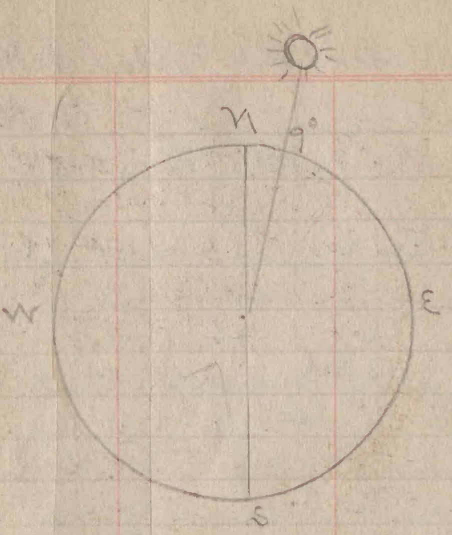
To the glacier today with our loads, a distance of about three miles. A strong wind and drift in our faces hindered us a bit going up but we came back on the run. Dogs seem to be in good shape.

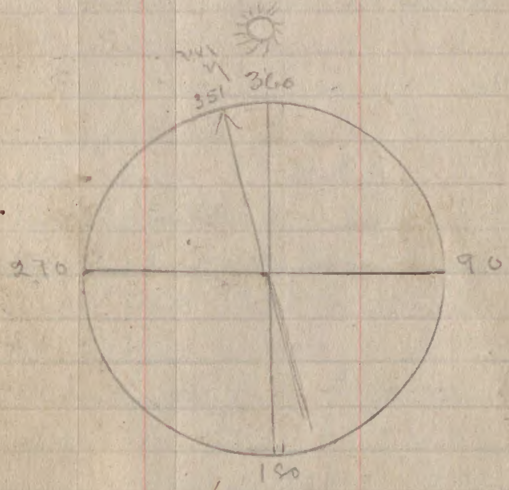
Four of the boys out after rabbits this afternoon. Un-ear-juk-yah killed 4 last night, but none today.

No signs of much open yet.

Ther. -28
Bar 6 P.M. 28.77
Sun bearing at 5-40 P.M.
351° or N 9° E

Brunton's Compass. No 6520.




N
351
360
270
90
180

Brunton Compass No. 6520

81° W. Long
79° 5' N Lat.

Time 5 - 40 P. M.
L. M. S. Etah .

Dif. in L. M. S. $33^{m}\ 18^{s}$

Suns Declination March 29 at Greenwich 0^{h} Apparent Noon
$3^{\circ}\ 21'\ 38''.5$

H. D. $58''.43$
Long + 5.4
60 | $315''.522$
$5^{m}\ 15.5$

81° W. L.
4
60) 324 ($5^{h}\ 24^{m}$
300
24

Dec

L. M. S. Etah $5^{h}\ 40^{m}$ P. M.
Dif in L. M. S. at camp $33\ 18$
L. M. S. at camp $5^{h}\ 6^{m}\ 42^{s}$
Long. W + $5\ 24$
G. M. S. $10^{h}\ 30^{m}\ 42^{s}$

H D. $58''.43$
Long + 10.5
29215
5843
60 | $613''.515$
$10^{m}\ 13.5$

Dec. March 29 Gr. 0h 3° 21' 33".7
Corr + 10 13.5
Corr. Dec. 5h 6m 42s 3° 31' 47".2
81 W. Long

Estab L. M. T. of Observation

5h 40m
Long 81° W − 33 18
L. M. T. 5 6 42
Long 81° W + 5 24
G. M. T. 10 30 42

Eq. T. 0h 4m 53.21
Corr − 7.98
Corr Eq. T. 4 45.23

H. D. 0s.760
G. M. T 10.5
Corr. − 7s.98

L. M. T. 5h 6m 42s.00
Eq. T. 4 45.23
L. A. T. 5h 1m 56s.77

Apparent Dec. Sun at

L. A. T. 5^h 1^m 56.77
Long 81° W 5^h 24
G. A. T. 10 25 56.7

Dec. Gr. 0^h 29^d 3° 21 38.5
Corr. + 10 9.4
Dec. 3° 31' 47.9''

H. D. 58''.43
G. A. T. 10.43
17529
23372
5843
60) 609.4249
Corr + 10^m 9^s.4

Sun's True Bearing at 79° N
at 5 P.M. App. Time with
Dec. 3° 30'
104° 5' W
C. B. + 9° E
C. Var. 113° 5 W

at 79° 5 N lat
81° W. Long

March 30 — 31

8 P.M. — 32

Bar 28.75

Head of Bay Fiord

at 5 o'clock this morning there was a voice at the door. We all thought it was Koolah-tinah announcing that he and his companions in the other igloo were through breakfast. To our great surprise it proved to be his brother Ah-pood-ah-ink-o from Etāh!!

He reached Nerky two days after Artie's left and Etāh two days after we had gone. He rested his dogs three days and then took after us! He covered the 150 miles in three marches, which we had done in seven! I thought we were doing well but this shows what an Eskimo can do.

We gave him a few hours sleep and left camp at 10 o'clock. Had good going up the glacier but caught the very devil coming down to "Glacier Pond". A strong easterly wind and drift made it rather uncomfortable for man and dog. Our clothes were driven full of "flour snow". As we ~~were~~ had perspired freely going up we were all pretty cold at the pond.

Here we made tea in the open at 24 below zero and waited for Panikpah.

The Eskimos amused themselves by cutting out figures of animals of snow which were remarkably good.

We gave up Panikpah and were about to start on when he came over the crest of the hill.

A short climb from here placed us on the downward track again and away we went through deep snow, over an icy surface and through rocks and sand. Many were the mix ups and loud the curses. Two traces were cut off under the runners and three other dogs became untwisted, my snap hooks being worthless.

Ahwelah lost his best dog. She showed signs of piblokto so he cut her loose.

In the river bottom we laboriously dragged over jagged rocks nearly all the way to our camp. As we arrived Ukkeahgwah vigorously waved his right arm, a sign to us of musk ox tracks. He and Koolah-tinah were very much excited and started right after them with all their loads. I persuaded them to wait for the others, picked out a place for our igloos, and drop every thing.

Ahwelah, [illegible] ~~and~~ Panikpah and I remained to build an igloo while the others went after the game. It was now about 2 o'clock this

morning. At four Koolabitunah was back reporting 9 killed and wanting the stove.
We were up at 8, had breakfast, and now my three men have all gone over to the slaughter ground some distance west around a point.
Am expecting them back at any time.
It was -44 at 4 o'clock this morning.

2 Obs. Alt ☉	30°	30	
Index Corr.?			
2	30	30	
	15°	15'	00.00
Corr -		19	32.04
	14	55	27.96

S.D. =	16'	2.04
Ref. -	3	30
Corr	19	32.04

Dec.	3°	44'	59
Corr +		5	18
Corr. Dec.	3	50	17

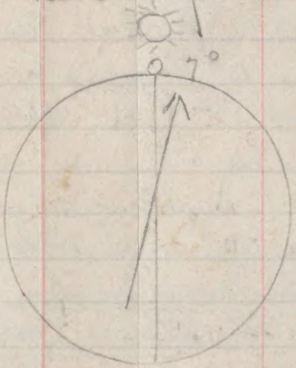
H.D.	58.27
Long 82° W	5 46
	5m 18

Z. 75° 4' 32

D. 3 50 17

Lat. 78° 54' 49"

At 4-40 P.m. – 30
Etah L.m.t.
Sun bearing 7°



At 5h 5m P.M. No 5 Watch
Sun bearing Magnetic North
Camp at head Bay Fiord
No 5 15 sec. slow on No 8

At 5h 30m P.M No 8 Watch
Sun bearing 353° 30'
direct reading. Or 6° 30' E

Compass variation 112° 58' W

L.A.T. 4h 49m 32s.7

at 6^h 10^m P.M. E. L. M. S.
Sun 344° direct or
16° E.

L. A. S. 5^h 30^m P.M.

Suns True Bearing 96° 36'
Mag 16° E + 16
Compass Variation 112° 36

At 7^h 35^m P.M. E. L. M. S.

Sun bearing 324° 30' Direct
or 35° 30' E.

Ther – 29 F 6 P.M

Ther – 42 F. P.M.

Sat, April 1st
11th day

Saturday, April 1st.

11 th day

Bay Fiord

Big Iglos Camp

A fine run today from head of fiord. We have covered as much in one march today as we did in two in 1914. It

It has been cold all day the thermometer registering 40 below zero since morning.

We picked up the other four men at their lunch box camp, seeing the vapor pouring out of the top of their iglos at least a mile away.

Just before reaching camp tonight we saw three musk oxen at head of bay and crossed a fresh bear track. There are also tracks of these along the ice foot here.

Tahliss, Panuligah, and Ah-jor-dah-ah-shabo have gone after the musk oxen so I am writing tonight with E-took-ah-shoo, Ascomissingwah, Koolatinah, and Inuar-jung-wah. They tell me that this is a cold igloo because it is made of old snow, new snow is much better being a poor conductor of heat or cold.

Sunday, April 2nd

12th day

8 P.M. 45° 30 E

Half way between big bay and cape.

30° E at 6-58 P.M.
48° E " 8-10 P.M.
51 E " 8-20 P.M.

Ther. -27.5

Arklio, Ak-Jood al-ilah-o, and Panikpah came in this morning with three large musk-oxen, two of which were very good specimens.

Arklio slept with us in the big igloo while the other two men camped under the skins at 45 below zero.

As a result of their late arrival we did not get started until noon.

I thought it best to start although late and possibly run into a bear.

Sure enough in about an hour we were hot on the trail. He was, or rather she was the very devil for activity. A varsity athlete!

After following her for five miles through rough ice she doubled on her tracks and took to the hills going to the top of what looked like a mountain to me who running after her with a camera. Meanwhile [illegible] had a whip to keep the dogs away and his father the gun. The other four men were strung out down the shore.

When she disappeared over the top of the highest hill with about 20 dogs at her heels I gave it up and went back after my team or what there was left of it.

In a few minutes she turned again and galloped down to the sea ice in front of [illegible] who ended her life with his 35. He, who did all the chasing lost the quarry.

Dogs are fed and we shall be in a half hour.

My dogs got after Amelio's sledge last night, eating up one of his boots and one of his stockings.

One of Ak-pood ah-shah-o's dogs was gored by a musk-ox yesterday and killed.

My fingers are cold. 20 below zero here in the igloo.

Bar 29.40

Monday, April 3, 1916

13 th day

Temp. at 5 P.M. -24

(a) at 4-46 Sun Mag. North
" 5.09 " 6° 30' E

at 5-25 2 Obs alt ☉ 21°12

at 5-30 P.M. Sun bearing 10° E
" 5-56 " " " 16° E
" 6-22 " " " 23° E
" 6-42 " " " 27°30' E
" 7-10 " " " 36°30' E

Lower end of Storsen Is. bears
55° 30' E
Upper end 157° E

(a) near sledge

I am wondering how long this is to continue—perfect weather and fresh meat every day. A bear ~~and~~ two musk-oxen and a hare today.

If I live to be a hundred I shall never see a better scrap with a bear than we had today. About an hour after turning into Eureka Sound we saw a bear sitting at a seal hole, I should say one mile from shore. She did not see us coming until we were about 150 yds away. The dogs were then at full gallop and every Eskimo shouting at the top of his voice.

She rose up, turned her black muzzle toward us, stretched out her neck and sniffed the air. Then she decided to leave which she did in jumps like the skipping of a gas engine. It was a cross between a gallop and a trot. Her gait would have driven a good horseman to drink!

A small pup of Nuarping-wah's was right at her hind-quarters taking a nip whenever she touched the ice.

I was second in the chase, my dogs going at full speed. I turned to get my camera out of the case and when I looked again I had passed Nuarping-wah and was within ten yards of the bear! Just then she turned. My dogs split, some going one side of her and some the other. In an instant my sledge ran right into her and she came almost on top of me. As I saw her coming I jumped and ran to one side. In a few seconds she was fighting for her life in the midst of sixty dogs. I was running back and forth trying to focus my camera and yelling for the Eskimos to shoot to save the dogs which we could hear yelping with pain. To my surprise there was not a rifle in sight. My dogs were still fast to the sledge and right in the midst of it! I yelled for Ahlee to get his revolver.

By this time the whole thing had started again south. Away we went I hanging to the back of the sledge yelling for my dogs to stop which is the last thing they thought of doing.

In the meantime the Eskimos were spending their time yelling and snapping their whips. Mearping-wah was brandishing a sealing iron and finally threw it into the body of the bear seeing Accomodingwah was

hopping around with a
35 full cocked I grabbed
it out of his hands and
poked it down between
the dogs and fired. the
scrap was over.

Just before sighting
the bear we had seen
two musk-oxen to the
south of us so we loaded
the bear on to Mean-ying-
walis sledge and drove
down. I sent Ah-pood-ah-
shuk. and E-took-ah-shoo
after them while the other
men constructed the igloos.

In two hours they were
back with two very old
males. One of these because
of a peculiar broken horn
I have had skinned out
for mounting.

Our game list thus
far reads 14 musk-oxen,
9 seals, three bears, 12 hare.

Tuesday, April 4. 1916

14th day

The Eskimos think we are at Bjornesundet. We are certainly on an island and have made at least 50 miles keeping the dogs going for 12 hours. At 8 this evening when we had about given up bears and musk-oxen, and were sitting on our sledges holding our noses in our hands, facing a light breeze at 40 below zero, E-tuk-ah-shoo sighted a bear and away we went forgetting all about the cold.

She must have been the sister of the one we killed yesterday. Acted exactly like her and had the same mix up with the dogs. As my traces were tangled I could not stir so ran into the mess as I did yesterday.

The dogs would have undoubtedly killed her if the boys had not. E-tuk-ah-shoo tried his automatic revolver and everything was

in 401 Automatic. My
little pup Nalu, was
running loose ahead of
the sledge and bravely
attacked the bears hind
quarters. She turned and
gave him a slap and
knocked him end over end.
He kind of felt himself over
and went at it again.

When the scrap was over
it was a bigger scrap for
us to keep the dogs from
tearing her to pieces. They
were fairly thirsting for blood.

[illegible] now came
running up exclaiming that
he had frozen his nose.
The Eskimos all grabbed theirs
and mumbled through their
fingers that mine was frozen!

It did it take me long
to clap my warm hand on it
and thaw it out.

In about an hour we were
on the trail again having fed
the meat to the dogs and
bringing the skin with us.
We were tired and cold
but kept plugging ahead

for this point at the entrance to an inlet.

According with Tunilu there is a bear very close to us judging by the action of the dogs. There are wolf tracks and caribou tracks all over the land, therefore we should get meat tomorrow.

Although we have covered fifty miles A— drove to after that bear but did not find him.

It is now 2 A.M. tomorrow!

Wednesday, April 5.

We had been sleeping only five hours when E— yelled through our door that he could see a bear up in the inlet. All but Panikpah harnessed up and drove off. They are back now at 2 P.M. failing to find him.

Sun bearing 55° W at apparent noon. Var 125° W

2 obs. alt Sun ☉ 35° 28'

2 Obs alt ☉ 35° 28'

I. C. − 1 12 ?

Corr. alt 2|34° 16'

h 17° 8'.00 "

Corr. + 12. 45.37

17° 20' 45".37

h

Z 72° 39' 14".63

d 6 8 58.3 ?

Lat. 78° 48' 12".93

S. D. + 16' 0".37

Ref. − 3 15.

Corr + 12' 45.37

Dec. 6° 3' 22".3

Corr. + 5 36.

Corr. Dec. 6° 8' 58".3

H. D. 56".95

Long 5.9

51255

28475

60|336".005

5m 36s

Ther. − 35

Bar 29.34

15
15
90
18

at 5-31 P.M. 11° 30' E
" 6-5 " 20° E

Thursday April 6.

16th day

Gletscher Fiord
89° 30' W 78° 12 N (?)

Sun bears 41° 30' E at 7-36 P.M.
" " 52° 30' E " 8-10 "
" " 58° E " 8-34 "
" " 64° E " 8-55 "

We are about five miles north west of Hyperit Point.

-35 F. when we bade good-bye to Panikpah and Koolah-tinah this morning at 10 o'clock. They were to return to Etah, distant about 270 miles. The former has six small pups in his team which are about all in; the latter has a small team and is anxious to get back. By them I am writing Jot.

For their return I gave them 15 lbs biscuit, 2 cans of condensed milk, one powdered milk can of sugar, one stick of tea, 3 tobacco each and two gals. oil. They have nothing whatever for their dogs but must depend upon the game resources of the country.

In spite of all signs of game at this camp we have failed to kill a thing. The bear got away. The boys came back one by one, with faces blue with the cold and showing the effects of long riding in a wind at 30 and 40 below. Their dogs had bear meat yesterday so must go without food today. To mine I gave two lbs pemmican each. Ka-she-we-ah, thro by mistake got four! As she happens to be my best pulling dog I did not begrudge her this extra amount.

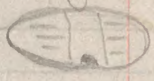
Upon leaving our igloos on the northern end of Bjornesundet we had a fine run over fiord ice for about 5 miles. We then laid our course across Blue Fiord for a valley with the vain hope of finding musk-oxen.

As we swung down the shore following the tidal crack we discovered the fresh tracks of a bear, feet "bunched" indicating a full gallop. It was our bear of yesterday 'making tracks' for the South.

The dogs got the scent and took us merrily along at a rapid rate through a breaking crust. At Sky Point there were tracks of musk-oxen, bear, and caribou up the shore about a mile away we could make out through the glasses three hare.

Having had nothing for breakfast but a cup of tea and a few biscuit we were meat hungry. Following the shore we soon made out four more hare on a hillside meaning war and Arklio bagged all and a ptarmigan as well, E-tuk-ah-shoo getting one hare also.

Proceeding on about five

miles we made camp, the boys building a very peculiar shaped igloo, one new to me, in the shape of ellipse and having two bed platforms. It is called a  tumáw-ah-ah, which means like the imprint of a kamik in the snow. Evidently hard to build as they had a vast deal of trouble to make the long walls stay up.

I learn today that a house dug out of a snow bank is called a Uai-yóu-ah.

We celebrate the date of the discovery of the Pole by having condensed coffee and a small drink of whiskey as I can only use a half can of condensed coffee for six of us its strength will not keep us awake.

We are covering nearly two degrees of longitude a day! At the equator this would represent 120 miles, but here it is only 25. A degree at the 77th parallel measures 12.5 miles. The distance around the earth here would be only 4500 miles as against 25000 at the equator.

Although we are going due west, in true west, our compass course is about 60° E! In other words to go west we head by compass NE by E!

In a few days to go west we shall head exactly east.

Our compass courses remind me of the old man's clock of which he made the remark: "When she strikes three, and the hands point at 10 in the morning, I know she is quarter past 5 in the afternoon!"

We have covered nearly 17 degrees of longitude since leaving Etah. There is a difference in time of 1^h 7^m 23^s at 1^h 7^m 23^s P.M. Etah M.T. it will be local mean time here at camp.

Find L.A.S.

L.M.S. 00^h 00^s 00^m
Long 5 58
G.M.S. 5 58 P.M.

L.M.S. 00 00 00 00
Eq. S. — 2 9.26
L.A.S. 11 57 50.74

Eq. T. Gr. 0h 2m 13s.52
Corr − 4.26
Corr. Eq. T. − 2m 9.26

H. D. 0s.710
Long in 6 G. m. T
4s.260

Watch m. T. 1h 7m 23s.00
Eq. T. − 2 9.26
~~L. M. Tpo~~ 1h 5m 13.74
apparent Noon

2 Obs Alt ☉ 37° 00' 00"
I. C. − 30"
2 | 36° 59' 30"
h 18° 29' 45"
Corr. + 13 2.33
18° 42' 47".33
True Alt

Z 71° 17' 12".7
D + 6 54 21.4
Lat − 78° 11' 34".1

S. D. + 15' 59".83
Refraction − 2 57.5
Corr. + 13' 2.33

Dec. 7th day Gr 0h 6° 48' 43"
Corr. for 89° 30' W + 5 38.4
Corr. Dec. 6 54 21 4

H. D. 56".40
Long. + 6h
60)338".40
+ 5' 38".4

Compass bearing of Sun
at apparent noon 49° 30' W
It should be 180° W
∴ Compass variation 130° 30' W

At 5-46 P. M. Sun 14° 30' E

E. M. T. 5h 45m 60
Long 89° 30' W 1 7 20
L. M. T. 4 38 40
Long 89° 30' W 5 58
G. M. T. 10h 36m 40

89° 30
4 4
60)356(5 60)120(2
300 120
56
5h 58m

Eq. T. Gr. 0^h 2^m $13^s.52$
Corr − 7.52
Corr. Eq. T. 2^m 6.00

H. D. $0^s.710$
G. M. T. 10.6
4260
710
7.5260

L. M. T. 4^h 38 37.00
Eq. T. − 2 6.
L. A. T. 4 36 31.

Dec. 7th Gr. 0^h 6° 48' 43".0
Corr. + 9 57.8
Corr. Dec. 6 58 40.8

H. D. 56".40
G. M. T. 10.6
33840
5640
60 | 597.840
9^m $57^s.8$

Suns Bearing 78° N Dec. 7th at 4^h 4^m
108° 12' W
Suns Bearing 14 30 E
Var. 122° 42' W

(Compass near sledges)

At 7^h 10^m Sun 41° E

L. m. T. ?

E. m. T. 7^h 10^m 00
Long 89° 30' W − 1 7 23
L. m. T. 6 2 37

L. A. T. ?

L. m. T. 6^h 2^m 37^s
Long 89° 30' W + 5 58
G. m. T 12 00 37

89°
4
60)356(5
300
56
5^h

30'
4
60)120(2
120
58^m

Eq. T. Gr 0^h 2^m $13^s.52$
Corr − 8.52
Corr. Eq. T. 2 / 5.00

H. D. $0^s.710$
G. m. T. 12
1420
710
Corr. 8.520

L. m. 6^h 2^m 37^s
Eq. T. − 2 5
L. A. T. 6 00 32 P. M.

Suns Declination?

Dec. Gr 0^h 7th day 6° 48' 43"
Corr. + 11 16.8
Corr. Declination 6 59 59.8

H. D. $56^s.40$
G.M.T. 12
11 2 8 0
56 4 0
60 | 67 $6^s.80$
Corr 11^m $16^s.8$

Suns True Bearing at 6 P.M. is
88° 34' W
Compass Bearing 41° E
" Variation 29° 34' W

(Compass away from sledges)

Sun 55° 30' at $8^h\ 9^m\ 28^s$

L. M. T. ?
E. M. T. $8^h\ 9^m\ 28^s$
Long. 89° 30' W 1 7 23
L. M. T. 7 2 5

L. A. T. ?
L. M. T. $7^h\ 2^m\ 5^s$
Long 89° 30' W 5 58
G. M. T. $13^h\ 00^m\ 5^s$

Eq: T. $G^r\ 0^h$ $2^m\ 13.^s52$
Corr - 9.23
Corr. Eq. T. 2 4.29

H. D. $0.^s710$
G. M. T. 13
2130
710
9.230

L. M. T. $7^h\ 2^m\ 5.^s00$
Eq. T. 2 4.29
L. A. T. 7 00 .71

Suns True Bearing at 7 P. M.
73° 55'
Compass Bearing 55 30
" Variation 129° 25' W

at 9^h-20^m P.M. thermometer reads -22.5; barometer 29.40
I think I can see the loom of North Cornwall on the horizon bearing about 13 degrees east of magnetic north.

Saturday April 8, 1916
18th day

at 1^h 2^m P.M. Sun 57° W
" 1 9 28 " " 53° 30' W
" 1 15 52° W

Length of large bear shot here
7 ft six inches
Girth 5 ft 2½
Length of small 6 ft 3 in
Girth 4 ft 5 in
Width with
Length of neck from oesophagus to shoulders 1 ft 2½ in

at 6^h P.M. Sun 21° E
" 6^h 20^m " " 25 E
" 6 47 " " 31° 30' E
7-9-30 37 30 E
Temp. -26

Yesterday I was somewhat anxious over our meat supply for the dogs, thinking perhaps we had passed the musk-oxen; today all looks bright again.

I went to bed about midnight expecting the boys at any minute. They had been gone then about fourteen hours. At 2 this morning they came in with thirteen musk-oxen. Our front yard is full of meat.

I decided to rest the dogs another day and fill them up as well so we remained in our sleeping bags until 10 o'clock.

A few minutes after breakfast Arklio spotted two bears fight out in front of our igloo about a mile away on the ice. In about an hour we had them both one a big male measuring 7 ft 6 in and the other a small female. Two dogs were so badly injured in the fight that one

Sun's True Bearing at 78° W
at 6 P.M. with 7° declination.

88° 33' W
Compass 37 30
" Var. 126° 3'

E.M.T. 6h 00m 00s
Long. 89°30' — 1 7 20
L.M.T. 4 52 40

Long. 89° 30
Estăh " 72 40
16 50
4 4
60|64 60|200
1h 3 1h 7m 20s

L.M.T. 4h 52m 30s
Long. 89° 30' + 5 58
G.M.T. 10 50 30

89° 30'
4 4
60)356(5 60)120(2
300 120
56

5h 58m

Eq. T. Gr. 0h 8th day 1m 56.59
Corr — 7.57
Corr. Eq. T. 1 49.02

H. D. $0^s.701$
S. M. T. 10.8
5608
701
7.5708

L. M. T. 4^h 52 40.00
Eq. T. 1 49.02
L. A. T. 4 50 50.98

Suns true bearing 105° 44' W
Compass Bearing 21° E
∴ Variation 126° 44

Sunday, April 9.

19 th day

Beyond No 22. 91° 30' W.
at 6^h 49^m Sun 30° 40' E
" 7^h 37^m " 43° E

We are tonight in sight of Cape South west, which we should easily make tomorrow Have covered 335 miles in 19 days, an average of 17.6 miles per day. Our two days at the last camp has taken our average down considerably.

To my surprise, we were

not fairly out of camp this morning when we ran into a bear. With three dead dogs behind us and one riding on the sledge we did not need to be admonished to "hold our horses".

Arklio took him with his Remington before the dogs could reach him. Although badly wounded she put up a good fight. We buried the meat and skin and came right on.

At 8h 00m P.M. Sun bears 44° E
Temp. - 26
Bar. 29.12

There are many tracks of foxes, ptarmigan, and lemming here.

In the river bed we find pieces of a good quality of coal.

Ah-pood-ah-Chah-o builds a very good double igloo.

Monday April 10, 1916.

20th day

Cape South West

Left camp at "22" at 11 o'clock arriving here at 4-15.

We find ice swept clean of snow and hard as iron. Sea ice looks good. Tracks of musk-oxen where we hitch our dogs.

at 4^h-40^m P.M. Sun magnetic north
" 5^h-10^m " " " 6° 30′ E
" 5-40 " " " 14° 30′ E
" 6-10 " " 22° E
" 6-49 " " 32° E
" 7-37 " " 44° E
" 8 " " 49° E

What looks like a small island bears 2½ E from Cape.

at 5^h 8^m 30^s 2 Obs. alt $\underline{\odot}$ 28° 40′

2. C 30 off 37 m

Temp. −15

Bar. 29.16

at 5^h 23^m 2 Obs. alt − 27°. 30′
" 5^h 45 " " " 26° 2′
6^h 13^m 30^s " " " ~~$\underline{\odot}$~~ 24° 9′ $\overline{\odot}$

at 7^h 18^m Sun 39° E

We are in a beautiful sheltered place for a camp. A light southerly wind out on the ice but here in behind broken pans of a berg there is not a breath.

While Uncarfing-wah is building the finest igloo I have ever seen, thirteen feet seven inches across the bed platform, I obtain some excellent azimuths and three good sights for longitude.

What a contrast to two years ago at this time when I reached the northern end of this land. With clothes driven full of snow and having faced a bitter wind all day we dug our way into a snow bank and slept. Everything was an uncertainty, my supporting party, my food supply, the location of Crocker Land, the condition of the ice.

Tonight the prospect is bright. I am here with enough of everything, —

20) 345 (17
20
145

23
13
15
41
23
343

590 lbs of pemmican, 137 1/2 biscuit, 48 cans milk, (five of which are condensed coffee) 5 lbs sugar, [illegible] tea for 40 meals, and twenty four gals. oil.

Our dogs are in fairly good shape after covering the 345 miles at an average of 17 miles a day. Arklio has thus far lost four and Mearjing-wah one. Two years ago they lost nearly all.

I can see North Cornwall very plainly now that the sun is working toward the north. By the map it lies 45 miles away. We cannot see Amund Ringnes Land. E-tuk-ah-shoo who stopped there on his way south with Dr. Cook tells me the coast is low therefore this may account for it). He also says they camped here at the point.

At the northern end of this land we killed caribou which gave us fresh meat before leaving. If we could only be so fortunate to get something here.

Sverdrup saw tracks of musk-oxen all along here fifteen years ago and killed a few caribou, I believe.

Ah-ford-ah-shu-o has driven up the coast in search of game.

10-30 P.M.

What luck! Two musk-oxen! Coming down the coast in a cloud of steam, right under the blazing sun low in the north-west we saw his team and heard Nucapingwah who had gone to meet him, yell "He has killed two musk-oxen!"

Laughing and shouting we escorted him into camp as if he were a general returning from foreign conquests!

Our dogs are fed and the Eskimos are eating raw brains and cracking bones for the marrow. The fat

is on for another supper.
What gluttons we are!

Long. W.	92°	5′	
" Etah	72	40	
Dif. in Long	19	25	
	4	4	
	60) 76	60) 100	
	1h	1 + 16m	40s
Dif. in time	1h	17m	40s

Eq. T. Grt 0h 11th day	1m	7.20s
Corr −		4.11
Corr. Eq. T.	1	3.09

H.D.	0.670s
Long. W	6.14
	2680
	670
	4020
Corr. −	4.11380s

Dif. in Time	1h	17m	40s.00
Eq. Time		1	3.09
at Etah M. T.	1h	16	36.91

It will be Local Apparent Noon
at 92° 5′ W

Declination at L. A. Noon 92° 5'.

Dec. Gr 0h 11th day 8° 17' 57".1
Corr. 92° 5' W + 5 38.3
Corr. Dec. 8° 23' 35".4

H. D. 55".11
G.M.T. 6.14
22044
5511
33066
60) 338".37 54
5m 38s.3

- - - - - - - - - - - - -

At Cape South West. Long.
92° 5 W. April 11, 1916.
Ther. −10 Bar 29.25

2 Obs. Alt. 40° 00' 00"
I.C. − 4 30
2) 39 55 30
Obs. alt 19° 57' 45"
Corr. + 13 23.76
h 20° 11' 8".76

Z 69° 48 51.24
D 8 23 35.4
Lat. 78° 12' 26".64

S.D. + 15' 58".76.
Ref − 2 3.5.
Corr. + 13' 23.76

At Apparent Noon Sun bears 50°40'W

True Bearing 179° 60'
Compass .. 50 40
" Variation 129° 20'

At $8^h\ 00^m\ 00^s$ P.M. Sun 49° E

Compass Variation ?

E.M.T.	8^h	00^m	00^s
Diff in Long.	1	17	40
L.M.T.	6	42	20
Long 92° 5 W	6	8	18
G.M.T.	12	50	38

Eq. T. Gr 0^h 10th day 1^m $23^s.420$
Corr. − 4.658
Corrected Eq. T. 1 18.762

H.D. 0.681
G.M.T. 6.84
2724
5448
4086
Corr. − 4.65804

L. M. T. $6^h\ 42^m\ 20^s.00$
Eq. T. – $1\ \ 18.76$
L. A. T. $6^h\ 41^m\ 1.24$

True Bearing Sun at $6^h\ 40'$ at 78° W, Dec. 8°

$78°\ 34'$ W
C. B. $49°$ E
C. Var. $127°\ 34$ W

- - - - - - - - - - - -

Supplies landed at Cape South West.

	Red	Blue	Total
Pemmican	40	45	590 lbs
Biscuit	125		
Oil	22		
Milk	42		
Sugar	4 lbs		
C. Coffee	8		
Tobacco	85	4 Plug	
Tea	49 meals		
Alcohol	1 unopened can		
Malt Milk	1 tin		
	E-took Yu	Arklio	Self.
Dogs			
Exposures	48		

To go west. —

40 Pkgs Tobacco
7 cans coffee 14 meals
7 sticks Tea 28 meals
42 "
15 gal. oil
Condensed Milk 30 cans

3 Plug Tobacco
3 Blue "
25 Pkgs Cig. Paper
1 Pipe
8 Rolls Photo Exposures
112 lbs. biscuit

To give men going home
2 Sticks Tea
5 cans Milk 4 gal. oil
7 Tobacco each
3 boxes matches "
2 Pkgs Paper

To leave at Cape South West
1 can Malted Milk
27 Tobacco Dukes Mixture
1 Plug
1 Blue
14 Pkgs Cig. Paper

3 gals oil
11 meals tea
3 lbs sugar
24 boxes matches (large)
12 .. wind matches
12 1/2 lbs Biscuit

Total weight on sledges

Pemmican	590 lbs
Biscuit	112½
milk	37
Oil	105 oil
my box	35 lbs.
	4|879½
	219.7 lbs

Give Nu	230
Give E. book	225
	455
Self	215
Artilio	209
	879

April 11. 1916
Cape South West

at 5h 40m P.M. Sun 17° 30' E
" 6 13 " " 24° E
" 6 49 " " 33 30 E

" 8h 12 Obs Alt Sun 5° 46'
" " " Sun bears 54 E
" " " Moon " 56 W
" " " Obs. Alt. Moon

Me 10 red 12 blue 152
E-Kuh " " 11 " 146
Archie " " " " 146
Self " " " " 146+35

Me	Ekuh	Arch	Self
10 red	10 red	10 red	10 red
12 blue	11 blue	11 blue	11 blue
B 50	B 50	C 35	Bac 40
C 35	C 35	M 30	milk 6
237	231	211	B 12½
			248

April 11, 1916
24

21st day

Cape South West

Our second night here, the boys tried to get more musk-oxen today but could only find one.

Ah-pood-ah-shaho and Accomoding-wah go back tomorrow.

Weather permitting we leave tomorrow for Amund Ringnes Island.

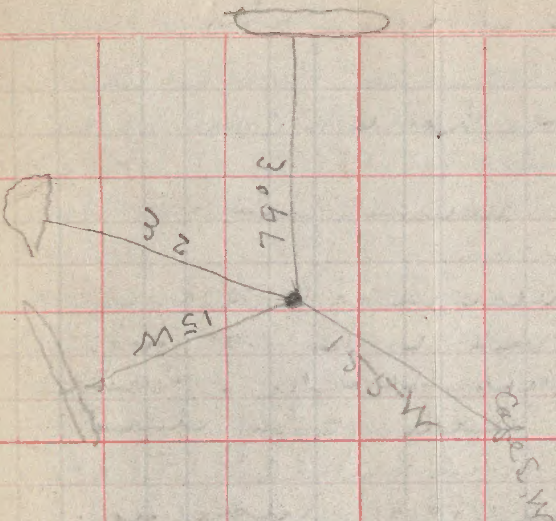
-30 at midnight
Bar 29.12

April 12, 1916

22nd Day

At 8 P.M. Sun 57° 30' E

It was ten minutes to eleven when I bade good bye to Ah-pood-ah-shaho and Accomoding-wah. The former had tears in his eyes, poor fellow. I confess I choked a bit



when I tried to tell him how satisfactory he had been. I waved to him as he headed toward home and we toward the west.

The Arctic Devil had his eye on us and started a cold wind and drift obscuring everything. The good hard going was soon succeeded by a slumpy crust.

We travelled for 8 hours and forty minutes with only two stops of ten minutes each to untangle our traces.

At the low estimate of
2½ miles an hour we
must have covered
20 miles, although the
land behind us looks
very near.

Every thing seems
out of place according to
Sverdrup's map. I have
taken bearings of land
seen and will take
more in the morning.
Working in a cold wind
at 28 below zero isn't
a bit comfortable, especially
when one has wet underclothes,
wet feet, and wet mittens.

I have tried to make
my kamiks (boots) go as
long as possible without
change. I have on only my
third pair in 22 days
which even surprises the
Eskimos.

E-took - tells me
that when with Dr. Cook
they passed two islands
to the north of us not
on the map. One is
rather large and one

small.

The boys are very happy, they seem every bit as much interested in what we shall find as I do. I believe an Eskimo is a natural explorer. He is anxious to see new lands and to examine all parts of it.

April 13, 1916
23rd Day
Amund Ringnes Land
Cape Ludwig

At 6-58 Sun 44° 40' E
Cape South West 145° W
at 7h 9m Sun 310 or 50° E
" ~~7 22 30~~ " 311 " 49 E
" 7 22 30 " 307° 30' 52° 30' E
" 7 44 " 302° 58° E
" 8h 00 " 298° 30 61° 30' E
" 8 32 " 291° 69° E

Just 8 hours from our igloo out on the ice a total of 16 hours and forty minutes from Cape South West. I should judge our rate was about 3 1/4 miles an hour. Allowing fifteen each for four stops to untangle traces, our actual time was fifteen hours and forty minutes. This makes the distance 50.8 miles. To save our dogs we have walked half of this at least.

Yesterday afternoon a land appeared north-west of us which did not correspond with anything on the map. I obtained a bearing of it of 79° E. Thought possibly as we went on it might fit it somewhere. Today, however, it was as much a mystery as ever. My Eskimos declared it to be Cape Luding and that I had failed and missed what we were headed for. Calculating mentally local apparent time ~~watch~~ from Etah mean time and taking a bearing of the sun I told them we were all right and the new land was not on the map. I could see that they were incredulous. As we worked west it soon opened out by Amund Ringnes Island proving itself to be a small island which I shall try to visit on my return.

There are tracks of caribou here along the shore. Tomorrow night we shall stop and try for game to save our pemmican. We were obliged to feed yesterday and today which cuts us down 20 lbs each.

Ther. − 23 at 8 o'clock
Bar 29.9
Ther − 28 at 10-30 A.M.

April 14, 24th day

at 7h-30m P.M. Sun bears 292°30
" " " " " 293
" " " " " 290
" " " " " 306°30
" 7h 44m " 303
" " " " " 298 30

At 7-44 P.m. Sun bears 304
" " " " " 301
$7^h 48^m$ " " " 300
" $8^h 8^m$ " " " 305°30
" " " " " " 309
" " " " " " 310
" " " " " " 306
" " " " " " 304

Having fed for two days on pemmican, I was a little concerned about the game supply on Amund Ringnes Island, realizing that the extent of my work depends upon this.

My fears were set aside, however, when we sighted a mother bear and two cubs far out on the ice of Henrickson Sound. They had heard us as we rounded the point to the east; consequently they had a good start. Our attention was first called to a streak of blood in the snow, the seal igloo, and the remains of the carcass. Arklio with the field glasses saw the bears in full flight for North Cornwall."

Hastily we threw off everything from our sledges and started. It was the longest fastest ride I have ever had, — at least 3½ miles, bounding from ridge to ridge. Before we were ready Ueearyuq-wah's dogs ran away breaking up the trace and he after them yelling for them to stop. He rejoined us when about half way out. During his run he noticed caribou and hare tracks! A good test of good eyes!

Far ahead of us we could see the mother and two little black dots by her side which we knew to be cubs. The mother turned twice as if to stand and fight but 42 dogs galloping toward her caused her courage to fail.

About ten loose dogs

stopped her and the fight was on. As I came up Mealying-wah stopped my team with his whip and yelled for me to run ahead and photograph which I told him I wanted to do. He also was holding E-took-ah-shoo's team for him while he ran ahead with me with his rifle.

I had just time to get one picture when E's team swept by me on the full jump. I heard a familiar cry almost under my feet. Looking down I saw two of E's dogs with one of the little bears in their mouths. I cracked one over the head with my fist and kicked the other and grabbed the cub in my arms. He was covered with blood and crazy with fright and crying like a baby with the croup.

In the meantime I was yelling for E to shoot the mother. I looked for

Mearfing-wah and saw him a half mile away pursuing the other cub with my team.

At this time Arklio arrived and I yelled for him to run and shoot and save the dogs. All the time I was backing around in circles trying to defend my little fellow from Arklio's team which were bound to get him. As his head was gripped under my arm and behind me and the rest, him in front of me I had some difficulty in guarding all sides. Arklio having shot the mother ran to my aid with his whip, and helped me get a rope around his neck and body.

Mearfing-wah soon came back with the mate in his arms, one much larger than mine. As he held him tightly against his breast the bear bit him on the lip! Mine drew blood on my wrist.

Having fastened the dogs we allowed the little fellows to run to their dead mother. It was pathetic to see them snuggle down on her breast, and one even began to suckle.

They were no longer afraid. We could pet them like pups. The boys loaded the mother on my sledge; the cubs climbed on top of her and away we went to the land.

Having photographed them at the camp I reluctantly gave orders for them to be killed which the boys did by choking with a rope through a hole cut in a small berg. If I was on my way home I would certainly try to get them to Etah and perhaps to the States.

Tonight they are on top of our igloo rolled up in the skin of their mother having their last long sleep.

April 15, 25th day

Cub Camp

Long. 96° 35'; Lat. 77° 52' (3

Long. Etah 72 40
Dif in Long. 23° 55
4 4
60|92 60|220
1^h 3^m 40^s
Dif. in time 1^h 35^m 40^s

Eq. time Gr. 0^h, 15th 0^m 5.23^s
Corr. 96° 35' W. 3.98
Eq. Time Noon 96° 35' W. 1.25

H. D. 0.619^s
G. m. T 6.44
2476
2476
3714
3.98636

Long 96° 35' W
4 4
60)384 60)140
6 2 20^s

Dif. in time, 6^h 26^m 20^s

Dif. in time Etah 1^h 35 40
Eq. time L. A. Noon 1
1 35 39

L. A. Noon 1^h 35^m 39^s Etah time.

Temp. −20 F Bar 29.25

Sun bearing	35° W		
True Bearing	180°		
Compass Var.	145° W		
Obs. 2 Alt. ☉	43°	20′	
I. C. −		2′	30″
2)	43	17	30
Obs. Alt	21	48	45.00
S. D. +		15	57.70
	22°	4′	42.70
Ref. −		2	23.3
h	22	2	19.40
z	67	57	40.6
d +	9	50	41.6
Lat.	77°	48′	2″.2

Dec. Gr. 0^h. 15th day	9°	44′	56″.6
Corr. for 96° 35′ W +		5′	45.
Corrected declination	9°	50′	41″.6

H. D. 53″.59

G. m. T. 6.44

21436

21436

32154

60) 345.1196

5^m 45^s

A day of rest, the first the dogs have had since leaving Etah 25 days ago.

Nucar-ping-wah and Arklio have gone after game; E-took-ah-shoo is drying out everything while I take observations.

We are encamped on a small island about a mile from land, one not on the map. I make our latitude 77° 48' 2".2; compass variation 145° W. We are practically between the two poles where theoretically the variation should be 180°, the maximum, where north is south, where east is west! Where things are somewhat twisted!

Our two cubs were delicious eating, let other explorers say what they will about bear meat.

4 P.M.

Boys back; no success. Report tracks of caribou, ptarmigan, and hare.

At 6^h 29^m Obs. 2 Alt ⊙ 26°

I.C. – 2' 30"

At 9-30 tonight just as we were getting ready for bed two wolves came across the ice to our camp. Arklio fired but overshot. E's dogs tore loose and galloped after them nearly out of sight, E following them with his rifle and calling to his dogs to come back.

Nucarpingwah jumped on his sledge and took after E who gave him his rifle as he passed. We can see him now returning with all the dogs. The wolves are headed for North Cornwall and still going.

Wind 1 N.W.

At 4^h 47^m P.M. Sun Mag. North.

	4^h	46^m	60
	1	35	39
L.A.T.	3^h	11^m	21^s P.M.

(a)					Var	
At	5^h	35^m	39^s	Sun	7° 30' E	1254
"	6	5	39	"	26° 30 E	13634
"	6	35	39	"	32° 30 E	1358
"	7	5	39		37 30 E	13245
"	7	35	39	"	Sulpher	
"	8	5	39		50° 30 E	13130
"	8	35	39	"	58° 30E	

(a) Compass near 20 tins pemmican

April 16. 26th day.

Sunday

Amund Ringnes Island

−38 F. 8^h 30^m A.M.

At 7^h 35^m A.M. Sun 173° 30 W

−21 7^h 00^m P.M.

Bar 29.32 " " "

At 5^h 50^m P.M. Sun bears 38° 30' E

" 6 35 " " " 50° E

" 6 59 " " " 55° E

" 7 49 " " " 67° 20' E

At 6 13 Obs 2 Alt ☉ 28°. 5'

6 15 30 Obs alt ☉ 13° 30' (sea ice)

6 18 30 Obs 2 alt ☉ 28° 12'

In camp tonight on the ice in the lower part of Hassel Sound some distance from Ringardholmen in long, I should judge, 98° 30' W.

Have been following the fresh tracks of an enormous bear but were compelled to stop as our dogs have certainly travelled thirty five miles. The going is excellent, a crust as hard as a pavement.

One of my dogs, Pe-see-ah is all in and will die, I think. He refused food tonight. I slipped him early in the day to save him if possible. He came into camp late, put his head in my lap, and was to sleep in a few minutes. I have raised him from a pup and think a good deal of him. The others are going well. We are now 442½ miles from Etah. Have made it in 26 days, an average of 17 miles a day.

Long 98° 30
Long Etah 72 40
Dif. Long 25° 50'
4 4
60)100 60)200
1h 40m + 3m 20s
Dif in time 1h 43m 20s

Time 6h 35
1 43 20
L.A.T. 4 51 40

Sun bears 50° E
True bearing 105° 6' W
Com. Variation 155° 6' W

Time 7^h 49^m
Dif. in time 1 43 20
L. A. T. 6^h 5^m 40^s

At 6^h 5^m 40^s Sun bore 67° 20' E
" " " " true bearing 86 41
Compass Variation 154° 1' W

Time 5^h 50^m E. M. T.
Dif. in time 1 43 20
L. M. T. 4 6 40
Eq. T. Nil

L. A. T. 4^h 6^m 40^s

Suns bearing 38° 30' E
True " 115 49
154° 19'

Time 6^h 59^m E. M. T.
Long. dif 1 43 20
L. A. T. 5 15 40

Suns bearing 55° 20' E
" true " 98 56
Compass Var. 154° 16' W.

Snow at 10^h 45 P.M.
Wind Force 1 N.W.
Has been hazy all day.
Can see no land in west or even north-west.

April 17, Monday, 27th day

Somewhere near Cape Nathorst

Long. 100° W   Lat 77° 45' N

At 7^h 40 Sun bears 69° E
8 29 " " 81° 30 E
8 44 . 86 30 E

Eight hours today at 3 1/4 miles an hour, at the least, a total of 26 miles. Hazy yesterday and very hazy today so I could not tell just where we were when we started. We tried to head about west from Ringardholmen and expected to make land in four hours. Since it took eight and this seems to be a cape

with shore trending west
I judge we are at Cape
Nathorst, or near it.
A number of bear tracks,
but no bears. Am becoming
concerned about our pemmican
supply. If we do not find
game soon the best I can
do is to reach Finlay Land
and possibly explore a little
of its western coast.
Our dogs are tired and
very poor. We are about
465 miles from Etah, an
average of 17 3 miles a day.
Tomorrow I shall send
the boys back into the
hills to find something. Even
snow-birds will be acceptable.
I must know if I can
depend upon this country
for anything at all. The
land all along here is so
low that at times we do
not know if we are on land
or ice. Should judge it
to be a fine grazing country
for caribou but poor for
musk—open or bare, offering
no protection against wolves.

I feel as if I had lost a friend — Pe-see-ah was left at the last igloo dying. I tried to tempt him with a pot full of hot bear soup but the poor fellow turned his head away. staggered to the sunny side of the igloo, curled himself up, and was to sleep when I left. He is now where there are no sledges, nor long, long, trails, nor cruel whips. He is the only dog I have ever lost on a trip. His death makes me think more of the others.

Brindle was sick all day yesterday but pulling well today. Dirty Face sick today but better tonight.

Long. 100° W
Etah " 72 40
Dif " 27 20
4 4
60 | 108 60 | 80
$1^h 48^m + 1^m 20^s$
Dif in Time $1^h 49^m 20^s$

(Eq. time Nil. Dec. 10°)
Compute again at Etah.

Time 7^h 40^m
Dif. 1 49^m 20
L. A. T. 5^h 50^m 40^s

Suns bearing 69° E
" true " 90 21
Com. Variation 159° 21' W

Time 8^h 29^m
Dif 1 49 20
L. A. T. 6 39 40

Suns bearing 81° 30' E
" true " 78 09
Com. Variation 159° 39' W

Time 8^h 44
Dif 1 49 20
L. A. T. 6 54 40

Suns bearing 86° 30
" true " 74 31
Compass Variation 159° 59' W
159 39
159 21
3|119
39
Mean 159° 39' W

April 18, Tuesday. 28th day

Long. 100° W

4

60 | 400

6^h 40^m

Dif. Gr. and camp

Eq. time at L. A. noon?

Eq. time Gr. 0^h 18th day 37.73^s

Corr. for 100° W + 3.81

Corrected equation 41.54

H.D. 0.573^s

S.m.T. 6.66

34 38

343 8

3438

3.81 6 1 8

L.m.T. 1^h 49^m 20^s

Eq. Time 41.54

L.A. noon 1^h 50^m 1.54^s

Ther. -23 Bar 29.68

Compass bearing of sun at 00^h 6^m 00^s

14° W

True bearing 180°

Compass Variation 166° W (?.)

Obs. 2 Alt. ⊙ 45° 35'

I. C. −		2	30
	2) 45°	32'	30"
	22	46	15
S. D. +		15	56.90
	23	2	11.90
Refraction −		2	23.
h	22	59	48.90
z	67	00	11.1
d	10	54	18.8
Lat.	77	54	29.9

Dec. Gr. 0h 18 d.	10°	48'	30.4
Correction for 100° W +		5	48.4
Corrected declination	10°	54'	18".8

H. D. 52".32
Time 6.66
313.92
31392
31392
60) 348".4 5 1 2
5' 48".4

This observation was taken on the assumption that I was at 100° W. I was 5 min late in starting and at least 3 min. in getting a good contact. Compass variation also late.

Oakland

Long. 88° 30' W
Lat 78° 30

L. M. T. Etah 1^{h} 3^{m} 20^{s} P.M.
L. M. T. Oakland 00^{h} 00^{m} 00^{s}.

L. A. T. ?

L. M. T. 00^{h} 00^{m} 00^{s}
Long 88°30' + 5 54
G. M. T. 5^{h} 54 00

Eq. T. 0^{h} 3^{m} $5.^{s}4600$
Corr − 4.2488
Corr. Eq. T. 3 1.2112

H. D. $0.^{s}732$
Long. 5.9
5888
3660
$4.^{s}2488$

L. M. T. 00 00 00.00
Eq. T. 3 1.21
L. A. T. 11^{h} 56^{m} $58^{s}79$

1^{h} 3^{m} $20.^{s}00$
3 1.21
1^{h} 18.79
Local Noon by Etah Time.

Thermometer

March 23 – 6 P.M. –20

" " Bar 30.30

Record Southern side Mt. Cornwall

May 1, 1916.

With one Eskimo, nineteen dogs, two sledges, I reached this point yesterday in three marches from northern end of island. Here I have placed two records, one in cairn near ice foot, and one on summit of head at altitude of 1200 feet.

Am on my return to Etah, North Greenland, from Finlay Land (King Christian Island). Have sent two Eskimo to Cape Southwest for musk-oxen. Leave for there today.

Killed one bear yesterday. Dogs in good condition. All well.

MacMillan

Game List

March	24	Smith Sound	1 bear
"	26	Flagler Bay	13 seals
"	28	River Valley	4 hares
"	31	Bay Fiord	9 M.O.
April	1	" "	2 hares
"	"	" "	3 M.O.
"	2	" "	1 bear
"	3	Eureka Sound	1 bear
"	3	" "	2 M.O.
"	3	" "	1 Hare
March	28	Als-fiord ah the	4 "
April	4	Eureka Sound	1 bear
April	5	" "	Not a thing
"	6	Hyperite Point	5 Hare
"	"	" "	1 Ptarmigan
"	7	Gletcher Fiord	13 M.O.
"	8	" "	2 bears
"	9	" "	1 bear
"	10	Cape South West	2 M.O.
"	11	" " "	1 M.O.
"	14	Amund Ringes I	3 bears
"	23	Ellef Ringnes I	3 "
"	26	North Cornwall	1 hare
"	29	" "	1 bear
May	2	" "	1 bear
April	29	Cape S.W.	17 hare
May	1	Axel Heiberg	1 bear
"	"	" "	2 ptar.
"	6	Bjnesundet	2 hare
"	"	"	2 Ptar.

Ah-tu-ark-te-bay -- Lie Tanglit

May	7	Eureka Sound	6 hare
"	8	Bay Fiord	3 hare

"The man who has not taken his life in his hands at some time or other has not lived". Stephenson.

Oo-blóo-yah-ílk-to
Period of twilight at night

Kark-séed-ah-hoot -- full of meat (man or dog)

sée-we-show -- a long trail

Nóó-uck -- -- spit

tee-ah-mé-we -- handle to a cup.
tlug-nuck-saut = " " " "

Nep-pee-yah -- tō go over a point
Sai-we-duck-ah-lunga.. I go around
E-tee-weg-loo -- tō go over a glacier
Nu-qu-ark-say-oo -- tō go around a point
King-you-pee-shóck-tō -- tō spill
Pee-tu-soun-ivit -- hitching strap
Kee-úck-so -- chew a trace
Ung-ah-shick-shock-suah -- far away
Kud-lug-teen -- tō put-stockings in kamiks
Ping-ee-lah -- I do not want it-
Nun-né-e-vit -- Where have you been
Kanno ung-ah-shick-she-wah? How far is it? -
Shuna-mih tak-o-vit? What-did you see?
Nou-yam-ah-witz? Are you hungry!
Nuna tahng-na? -- Is that land?
Nung-ne-ung-né-pa seeko?
Is the ice safe?
Tuk-koo-ái-yuk -- Do you see?
Tu-shi-we-yuk -- Do you hear
Broken --- pillukkia
Suna takuvink -- What do you see?
Kaso-ka-hunga -- I am tired
Oo-ta-sadder-me-óop-tah -- last igloo
ishe-look-tō -- eye inflamed
Nack-kay-dee-actinga. I shall cook meat.
Na-hack-lóo ---- low (ground)

Pilk-sing-ée-lō-suah. not drifting
Pook-ting-nuck - - - slush
ah-mah-hówks-suah - - not-frozen
Kaful-née-o - - - lasso
Kapsini vo-cud-ah-kil-?
" tuk-tu-pil-?
" vo-nung-nuck-pil-?
Nōg-wah caribou 1 year
aug-ah-yuk-lullah 2 .. s
Kahago tesunga pee-ark-tō
When will he be here?
In-nul-e-ark-tōo-e-ac-tootin?
are you going to bed?
In-nay-ark-tunga - I am
going to bed.
In-nul-ee-ark-tō-ka? Has he
gone to bed?
E-tah-mun nuck-shay-ei?
are you going to take it-Etah?
O-kah-mu-ook-lō - go with the wind
Ark-shóck-lō - - head wind
Ap-cung-nuck - - water hole
Noo-doo-actō - - wave the arm
Nock-loo - - knot
E-too-ée-tok - - go over a point
to-rang-ne-áh-po - - to aim
mick-ee-shoo-pud-oo-eal - small pieces
Ei-máh-hah - - is it lost?
nunny-vah - - I have found it.
Ark-taik-lugo - - skin a rabbit

There is a small
cache around point
up Eureka Sound
6 cans
4 red
6 blue

32
36
68

We left oil here in 1914

From Etah
6 cases Biscuit
4 cases Oil
12 cases Pemmican

Ish-shem-áctō -- to fold or shut up
Ish-e-mah-áctō -- pocket-knife
Nar-wick-tō -- to break as a finger :
a piece of biscuit, a stick
ah-dick-tō -- to rip as a seam in
a koole-tah
Ah-wick-tō
Nar-wick-shem-ah-how, butt of
a gun broken
Sa--hem-mí-ah, off in the distance
below us

68
66
284
418

Caches

Across from Coal
valley N.N.W
6 cans red
3 " blue

48
18
66

Bay Fiord
28 red
10 blue

224
60
284 lbs

Island Cache
132 lbs pemmican
125 Whole Wheat
25 lbs white
1 gal oil

Pim Island
11 blue
6 red
150 lbs Whole Wheat
4 gals oil
a little Alcohol

Mean Refraction Table

Alt	Ref.	
0°	36'	29.4"
1	24	53.6
2	18	25.5
3	14	25.1
4	11	44.4
5	9	52.0
6	8	28.0
7	7	23.8
8	6	33.3
9	5	52.6
10	5	19.2
12	4	27.5
14	3	49.5
16	3	20.5
18	2	57.5
22	2	23.3
26	1	58.9
30	1	40.6
40	1	9.4
50		48.9
60		33.6
70		21.2
80		10.3
90		00.0

42
19
23

175
42
33
20
6

2)175
37
19
18

March

15 16 17 18 19 ⑳ 21 [22] 23 24 25 26 27 28 29 30 31

April

① 2 3 4 5 ⑥ 7 8 9 10 11 12 13 14 15 16 17
18 19 20 21 22 ㉓ 24 25 26 27 28 29 30

May Pups

1 2 3 4 5 6 7 8 9 10 11 ⑫ 13 14 15 16 17
18 19 20 [21 22 23 24 25 26 27 28 29 31

June

1 2 3 4 5] 6 7 8 9 10 11 12 13 14 15

Milk 15-14-24
Biscuit 15-50-25-50-37½-12½
Tea
Oil 5-5-5-5-4-5
Pemmican

Akkio	24 shoped	3	24, blue	4
Nn	48 " "	6	48 " "	8
ak	48 " "	6	54 "	9
E	48 " "	6	48 "	8
ac	64 " "	8	54 "	9
Kool	64 " "	8	30 "	5
Ram	296	37	30 "	5
	3	3	288	48
		40	296	
			584	

Equipment for Eureka Sound

Weight

Two tents - with flys
Two Poles
Primus
Jewell
Blue Flame
Pots
Oil
Alcohol
Matches
Spare harnesses
Spare Traces
Spare Whips
Snow Glasses
Compass →
~~Sextant~~
Pocket Knife (2)
Hunting ,, (3)
Extra Clothes
Note Books (6)
Reading Matter
Clippers
Sewing Bag
Malted Milk
Sweet Chocolate
Candy
Biscuit
Oatmeal
Condensed Milk

Gun Mitts
Tea
Condensed Coffee
Dehydrated Potatoes
" Onions
Salt
Pepper
Buckwheat
Frying Pan
Safe 1.
Bird Equipment
Tow
Corn Meal
Camera
Films
Field Glasses
Soap
Towel
Tooth Brush
" Paste
Maps
1 Kyack Wood
Paddle
Shot gun
Shells
Rifle
Cartridges
Traps
Pencils

Cards,
Leaves from Almanac
Harmonica
Dominoes
Chips

March

Declination S. D

To convert mean into apparent time.

L. m. T.	3^h 05^m 00^s
Long. " +	5 25
G. m. T. "	8^h 30 00

Eq. T. 0^h	1^m 17.61
Corr. " +	4.40
	1^h 22.01

H. D. " +	$0^s.518$
G. m. T. " +	8.5
Corr +	$4^s.403$

L. m. T. "	3^h 05 00
Eq. T. " +	1 22.01
L. A. T.	3 06 22.01

To convert long. into time

50° 40' 15" W. Long

$$\begin{array}{r} 50 \\ \underline{4} \\ 60)\,200\,(3^h \\ \underline{180} \\ 20^m \end{array} \qquad \begin{array}{r} 40 \\ \underline{4} \\ 60)\,160\,\lfloor 2^m \\ \underline{120} \\ 40^s \end{array} \qquad \begin{array}{r} 15 \\ \underline{4} \\ 60)\,60\,(1^s \\ \underline{60} \end{array}$$

Ans 3hrs 22m 41 sec

- - - - - - - - - - - - - - -

101° 30' W. Long

$$\begin{array}{r} 101 \\ \underline{4} \\ 60)\,404\,(6^{hrs} \\ \underline{360} \\ 44^m \end{array} \qquad \begin{array}{r} 30' \\ \underline{4} \\ 60)\,120\,(2^m \\ \underline{120} \end{array}$$

Ans 6^{hrs} 46^{min}

To convert time into long.—

Multiply hours by 15 to get degrees. Divide the minutes by 4, and add the quotient to the number of degrees. Minutes left over multiply by 15 Divide seconds by 4, and add the quotient to the minutes. Finally multiply the remaining seconds by 15.

4 hrs., 29 min., 38 sec.

4
15
60
7
67°

4)29(7
28
1 × 15 = 15'
9
24'

4)38(9
36
2 × 15 = 30'

Ans 67° 24' 30"

Obs. Alt., 40° 04' 00"
Corr., + 13 21
h 40 17 21

z 49° 42' 30"
d 23 27 22
L 73 10 01

S.D., + 15' 46"
2.C., + 3 00
+ 18 46

Dif., − 4' 23"
p+r., − 1 02
− 5 25

Corr. + 13' 21"

Dec 23° 27' 20".5 N

H.D. 0".32
Long., + 4
1".28

Dec 23° 27' 22"

12.5
3 60
75 00
375
20)4500.0(225
40
50
40
10

Parallel of Latitude	Length of Degree
75°	15.577
76°	14.560
77	13.539
78	12.514
79	11.485
80	10.452

Stat. miles	Geo. miles
10	8.68
11	9.54
12	10.41
13	11.28
14	12.15
15	13.01
16	13.88
17	14.75
18	15.62
19	16.48
20	17.35
21	18.22
22	19.09
23	19.95
24	20.82
25	21.69
26	22.56
27	23.42
28	24.29
29	25.16
30	26.03
31	26.89
32	27.76
33	28.63
34	29.50
35	30.36

Etah

Long. 72° 40' W

Time $4^h\ 50^m\ 40^s$

Latitude 78° 18' 30"
Colatitude 11 41 30
Sun rises Feb. 19th
Sun sets Oct. 24 "

Dark period 118 days

Sun rises and sets
from Feb. 19 to Apr. 21
a total of 61 days

Continual day from
Apr. 21 to Aug 23
a total of 124 days

Sun rises and sets
from Aug 23 to Oct 24
a total of 62 days

Work to be done

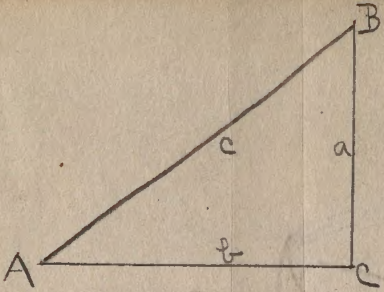
Tidal observations
Bird work
Meteorological
Exploration
Summer Hunting
Study of snow flakes at
different temperatures.
Take magnifying glass

E-took-ah-shoo
Drawers Knife Braces
Cap 80 cartridges
Chewing Tobacco

Kootah Tinah
Drawers cap Braces
Shirt 80 - 35
Chewing Tobacco

Accomoding-wah
Shirt Knife Braces
Drawers 80 - 35
Chewing Tobacco

Panikpah
Shirt Braces
80 - 3.5
Stockings
Chewing Tobacco



$\frac{a}{c} = \sin A \quad \therefore a = c \sin A$

$\frac{b}{c} = \cos A \quad \therefore b = c \cos A$

$\frac{a}{c} = \sin A \quad c = \frac{a}{\sin A}$

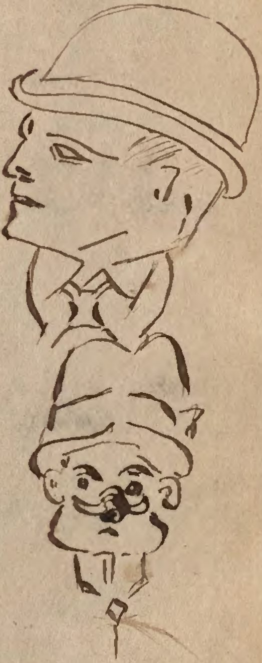
$\frac{a}{b} = \tan A \quad \therefore a = b \tan A$

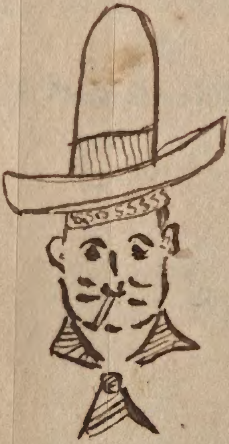
$\frac{b}{a} = \cot A \quad \therefore b = a \cot A$

$\frac{b}{c} = \cos A$

$\therefore b = c \cos A \quad \therefore c = \frac{b}{\cos A}$

- prosecuting to the utmost the object for which the expedition was fitted out.



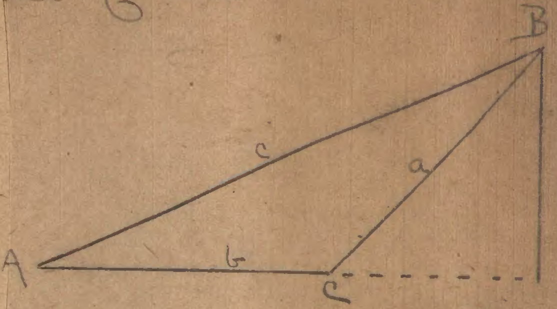


Books

1 Discovery of a North West Passage Capt. Osborn.

2 Cruise of the Arctic

3

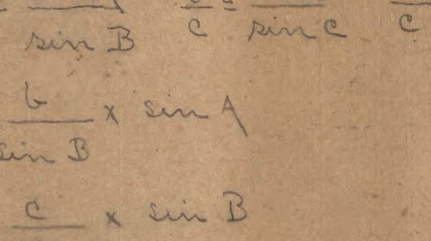


$$\frac{a}{b} = \frac{\sin A}{\sin B} \quad \frac{b}{c} = \frac{\sin B}{\sin C} \quad \frac{a}{c} = \frac{\sin A}{\sin C}$$

$$\therefore a = \frac{b}{\sin B} \times \sin A$$

$$b = \frac{c}{\sin C} \times \sin B$$

$$c = \frac{a}{\sin A} \times \sin C$$



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